Documentation Sheet

National Aerospace Laboratories	**Class** Restricted **No. of copies** 10

Title Evaluation of aerodynamic performance of sidewall compression intake relevant to air breathing propulsion vehicles for intake flow entry at M = 3.5

Author/s

Sajeer Ahmed, N B Mathur, C. Manisankar

Division EAD	**NAL Project No.** E-1-236
Document No. PD EA 1106	**Date of issue** April2011

Contents 44 **Pages** 39 **Figures** 1 **Tables** 3 **References**

External Participation ARDB

Sponsor DRDL, Hyderabad

Approval Head, Experimental Aerodynamics Division

Remarks

Keywords Sidewall intake, Mach number, contraction ratio, back pressure, mass flow, Supersonic speeds

Abstract

Wind tunnel studies were carried out on a 1:8.5 scale of side wall compression intake configuration model at free stream Mach number of 3.5. Starting characteristics of the intake was ascertained through wall pressure distribution and flow visualization pictures. The model has a convergent section, a nearly constant area section and divergent section, followed by a mass flow meter with a variable rear flap. Sidewalls with different leading edge sweeps of 30 and 45 degrees have been tested. Effect of sweep on mass flow has been studied for all cowl lengths. Pressure recovery is obtained for maximum cowl length. Results show sidewall sweep and the cowl length affect the mass flow entering the intake; and the maximum mass flow is seen with 30F sweep and the maximum range of mass flow is seen with differential sweep for a minimum cowl length.